Student “t” and Oneway Anova

GOAL: Become proficient in using JMP IN software to analyze data.

Objective: To test the hypothesis that force is a function of method for Chapter 12 problem 1. And to test the hypothesis that thickness is a function of run subgroup for the oxide thickness data.

Introduction: We will use JMP to evaluate Chapter 12 problem 1 as an example. Then you will use JMP to evaluate the data for oxide thickness. The run subgroups in the data can be assumed to be from different oxide furnaces. We wish to determine if all of the furnaces can be used for processing wafers. If all the furnaces do not give the same oxide thickness, then what furnaces can be used to give the same process response?

The data files can be found on the webpage.

Procedure:

Start up JMP IN.

Create a table of the data for Problem 1 in Chapter 12.

Analyze the data using Distribution. Note the mean, standard deviation, and sample size for each method.

Select the force plot and Test Std Dev. Enter the value of the other method to test against. This test is sample vs population.

Select the force plot and Test Mean. Enter the value of the other method to test against. This test is sample vs population.

The data you have is actually sample vs sample. So it should be analyzed by Fit Y by X. Enter the columns for Y and X.

Select Oneway Analysis, then Means and Std Dev.

Note: Page 279 of Barker, Quality by Experimental Design, 3rd edition has flow chart for testing means.

Select Oneway Analysis, then UnEqual Variances. For $H_0: \sigma_a = \sigma_b$; do we Reject the Null? Discuss this with the class.

Select Oneway Analysis, then Compare Means > Each Pair, Student’s t. For $H_0: \mu_a = \mu_b$; do we Reject the Null? Discuss this with the class. What is $\alpha$ level?
Select One Way Analysis, then Set Alpha Level > .01. For \( H_0: \mu_a = \mu_b \); do we Reject the Null? Discuss this with the class.

Now close the analysis window. Then select Analyze, Fit Y by X, and then enter the columns for Y and X. Select One Way Analysis, Means/Anova/t Test. Do the results here give you the same information as concluded above? Discuss with class.

Close your data and analysis windows for Chapter 12 problem 1.

**FOR the Report:** Now open lab3_thickness file and use the techniques learned to analyze the data and make your conclusions. Use an \( \alpha = 0.05 \).

Note that there is also data labeled “random1” through “random 5” in the file. These are just random numbers between 0 and 100. If you analyze this data do you expect to find any significant relationships?

**The Report** should contain all of the sections as per the guidelines. Be sure to include a cover page, Goal and Objective statements, Explanation and assumptions for the thickness data used, analysis of data, results (answer question asked in Introduction) and Conclusions.